



Atty. Docket No. INK-097  
(2108/49)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICANTS: Albert *et al.* CONF. NO.: 1236  
SERIAL NO.: 09/917,325 ART UNIT: 2674  
FILED: July 27, 2001 EXAMINER: A. Eisen  
TITLE: MICROENCAPSULATED ELECTROPHORETIC DISPLAY WITH  
INTEGRATED DRIVER

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**DECLARATION OF JONATHAN D. ALBERT AND HOLLY G. GATES**  
**UNDER 37 C.F.R. § 1.131**

We, Jonathan D. Albert and Holly G. Gates, hereby declare as follows:

1. We are the co-inventors of the subject matter described and claimed in the above-referenced patent application.
2. We conceived and reduced to practice the subject matter of claims 1-20 in the above-referenced patent application, U.S. Serial No. 09/917,325, in the United States at least as early as January 30, 2001.
3. More specifically, we conceived and reduced to practice the subject matter of claims 1-20 in the above-referenced patent application, U.S. Serial No. 09/917,325, in the United States prior to January 30, 2001, by developing a working model thereof as part of our research at E-Ink Corporation, Cambridge, MA.
4. Attached hereto as Exhibit A is a true copy of an Invention Disclosure, signed and witnessed, and attesting to a date of conception prior to January 30, 2001, and redacted in accordance with MPEP 715.07(II). This Invention Disclosure provides evidence of the

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conception of at least one embodiment of the subject matter, claimed at least in independent claim 1, of the above-referenced patent application, U.S. Serial No. 09/917,325, prior to January 30, 2001. For example, the figure shown in this Invention Disclosure illustrates an electrophoretic display element in electrical connection with a control circuit (drive chip), where the display element and control circuit are co-located on a substrate.

5. Attached hereto as Exhibit B is a true copy of an email dated prior to January 30, 2001, and redacted in accordance with MPEP 715.07(II). This email message is from an in-house counsel of the assignee of the above-referenced patent application to the assignee's outside patent counsel. This exhibit provides further evidence of the conception and reduction to practice of at least one embodiment of the subject matter, claimed at least in independent claim 1, of the above-referenced patent application, U.S. Serial No. 09/917,325, prior to January 30, 2001. For example, the email describes one embodiment of the invention as comprising an electrophoretic display and a control circuit (drive chip) mounted on the same flexible substrate. Furthermore, the email references the existence of a prototype of at least one embodiment of the invention.

6. Attached hereto as Exhibit C are photocopies of the front and rear of a working model of an electrophoretic display assembly of the present invention. This working model is referenced in the email message under Exhibit B, date stamped with a date prior to January 30, 2001, and redacted in accordance with MPEP 715.07(II). These photocopies of the working model are the basis of Figures 4A and 4B of the present Application and are described in detail on pages 8 and 9 of the specification. These photocopies provide yet further evidence of reduction to practice of at least one embodiment of the subject matter, claimed at least in independent claim 1, of the above-referenced patent application, U.S. Serial No. 09/917,325, prior to January 30, 2001.

We hereby declare that all statements made herein of our own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements, and the like so made, are punishable by fine or imprisonment, or both, under Title 18, Section 1001 of the United States

Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 10/11/2004

Jonathan D. Albert

Jonathan D. Albert

Date: 10/15/2004

Holly G. Gates

Holly G. Gates



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This is Exhibit A to the above Declaration.



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**CERTIFICATE**

I, David J. Cole, a Notary Public of the Commonwealth of Massachusetts, do hereby declare that I have compared the Attachment to this Certificate which the document of which it purports to be a copy, namely an Invention Disclosure Form found among the business records of E Ink Corporation, of 733 Concord Avenue, Cambridge MA 02138-1002, and that, except for the redaction of certain names and dates by the use of areas of solid black, the accompanying copy is identical to the original document.

Certified this 7th day of October 2004 at Cambridge, Middlesex County, Commonwealth of Massachusetts:



*David J. Cole*

David J. Cole  
Notary Public  
My Commission expires October 4, 2007



P129

## E Ink Invention Disclosure Form

### 1. DESCRIPTIVE TITLE OF THE INVENTION:

Microencapsulated electrophoretic display with integrated driver

### 2. POSSIBLE INVENTOR(S):

Please enter the name, residential address and citizenship of each person believed to have made an inventive contribution to the conception and/or reduction to practice of the invention.

Name	Address	Citizenship
J.D. Albert	346 Putnam Ave, Cambridge, MA 02139	USA
Holly Gates	115 Porter Street, Somerville, MA 02143	USA

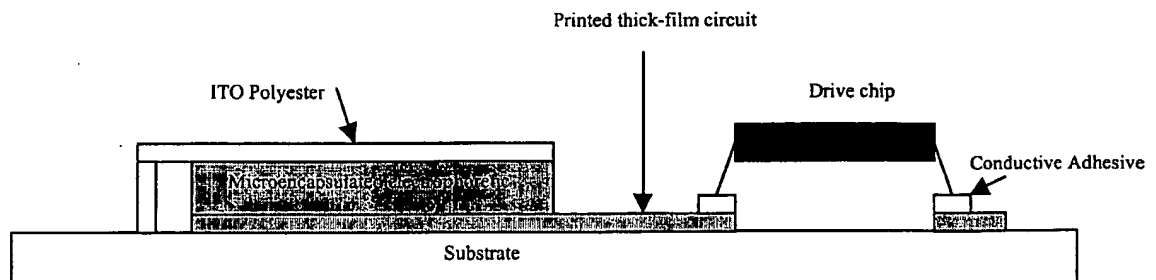
### 3. DESCRIPTION OF THE INVENTION:

In the past, display manufactured kept the drive chips separate from the display substrate. With the advent of chip on glass technology, glass based displays were able to integrate the driver chip directly onto the glass substrate. This increased reliability and decreased manufacturing costs.

Plastic based display requiring drive chips have traditionally isolated the display substrate from the driver. However, to reduce manufacturing steps and provide a more cost effective solution to this problem, a method of integrating the display and the driver was sought.

A solution was found utilizing surface mount conductive epoxy. It is known that traditional solder components can be mounting on thick film based circuits using conductive adhesives such as silver loaded epoxy. This technology has been used to mount surface mount LED's on membrane switches, and more recently to completely replace copper clad circuit boards in some applications. Work is being carried out right now to mount bare dies to thick film based circuits.

Our method involves printing the control lines for the driver chip and the control structure for the display on the same substrate. The chip is then mounted to this circuit using conductive adhesive. Other components such as connectors and passives can be mounting at the same time. Finally, the microencapsulated display material is laminated or coated onto the control structure.



**4. COMMERCIAL POTENTIAL OF THE INVENTION:**

This could make direct drive displays more affordable.

**5. RECORD OF INVENTION:**

When did you first think of  
this invention?

[REDACTED]

What record do you have to  
substantiate this date?

Meeting with

[REDACTED]

To whom did you first disclose  
this invention?

On what date did you make  
such a disclosure?

What written evidence do you  
have of this disclosure to  
others?

When did you first do any  
experimental work toward  
carrying out the invention?

Who observed the progress of  
the experimental work?

When did you first make written  
description of this invention?

**6. PREVIOUS PATENT APPLICATIONS:**

Have you previously filed a patent application related to this invention?

YES

**NO**

If yes, please attach a copy of the patent application with its serial number and filing date. What is the current status of the application?

**Status:**

**7. PUBLIC DISCLOSURE INFORMATION:**

Please list any papers, abstracts, internet postings, etc. describing the invention which have been published or submitted for publication. Include the title, journal and date or estimated date of publication.

Please indicate whether any oral presentations (including slide or poster presentations) of the invention have been or will be made, the date and to whom, including vendors or collaborators of E Ink.

Please give details of any public use, commercial use, sales or offers to sell this invention.

**NOTE PUBLIC DISCLOSURE OR USE, INCLUDING DEMONSTRATIONS, PRINTED PUBLICATIONS, ABSTRACTS, ORAL PRESENTATIONS, INTERNET POSTINGS, SALES OR OFFERS TO SELL MAY RESULT IN IMMEDIATE LOSS OF RIGHTS TO OBTAIN PATENT PROTECTION. PLEASE ATTACH A COPY OF ANY PAPER, ABSTRACT OR OTHER PRINTED PUBLICATION, OR A ROUGH DRAFT IF THE PUBLICATION IS NOT YET IN FINAL FORM.**



**8. EXECUTION:**

Each inventor and one witness must read, understand, sign and date each page of the invention disclosure, including any figure(s).

Signature of Inventor (s)	Date	Read and Understood by (witness)	Date
J.D. ALBA		Michael Mendel	
HARRY GATES			



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**UNDER 37 C.F.R. § 1.131**

This is Exhibit B to the above Declaration.

[REDACTED]

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**From:** [REDACTED]

**Sent:** [REDACTED]

**To:** [REDACTED]

**Cc:** [REDACTED]

**Subject:** Your docket INK-097 - Microencapsulated electrophoretic display with integrated driver

PRIVILEGED AND CONFIDENTIAL

Dear [REDACTED]

Pursuant to our telephone conference yesterday regarding the desirability or otherwise of eliminating the restriction to "printed" electrical connections in claim 1 and elsewhere of the above proposed application, I have discussed this matter in considerable detail with JD Albert and would offer the following guidance regarding the appropriate scope of the claims in this case.

This invention does not reside in the printing of the electrical connection; indeed, the combination of a flexible substrate with a printed electrical connection having two separate contact pads, and an electrophoretic display in electrical contact with one of these pads is disclosed in some of Prof. Jacobson's early cases.

Rather, the essence of the present invention is mounting both the electrophoretic display and the drive chip on the *same* flexible substrate, in contrast to our prior art method, in which the electrophoretic display is formed on a flexible substrate and the drive chip is mounted on a rigid printed circuit board, with the consequent need for the relatively difficult and yield-reducing step of electrically interconnecting the flexible substrate and the board. Eliminating the rigid printed circuit board greatly simplifies manufacture, since one can print the rear electrodes, the insulating layer provided with conductive vias, and the leads from the vias to the drive chip successively on to the same substrate, and then surface mount the drive chip on to this substrate. The complete backplane thus produced is then simply laminated, using a laminating adhesive, to the electrophoretic layer which has already been coated on the front electrode

Accordingly, I respectfully suggest a main claim along the following lines:

An mounted electrophoretic display assembly comprising:

a flexible substrate;

an electrical connection formed on the flexible substrate and having first and second contact pads spaced from one another;

an electrophoretic display element in electrical communication with the first contact pad; and

a control circuit mounted on the flexible substrate and in electrical communication with the second contact pad.

This form of claim eliminates the restriction to printed electrical connections though it is narrower than your proposed claim 1 in requiring the presence of the control circuit (chip).

I am forwarding with a hard copy of this E-mail photocopies of the front (i.e., the surface on which the drive chips are mounted) and rear of a prototype quad (four-character unit) of this invention. The two additional chips at the lower end of the quad are interface chips used to connect the drive chips to control circuits off the quad, and are surface mounted in the same way as the drive chips. The leads connecting the two sets of chips are of course printed in the same operation as that which forms the leads connecting the drive chips to the rear electrodes.

[REDACTED]

Sincerely,

[REDACTED]

[REDACTED]

[REDACTED]



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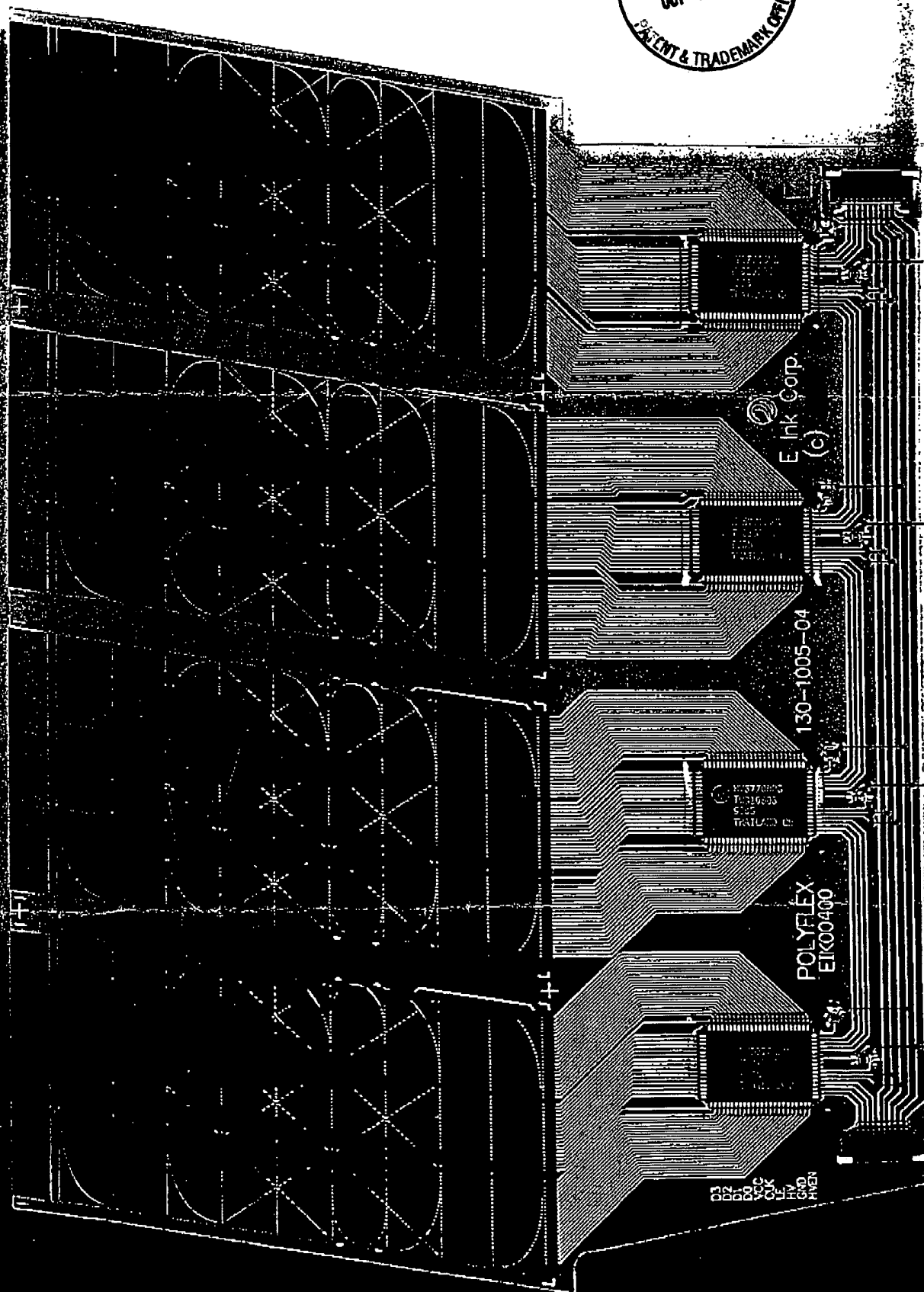
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This is Exhibit C to the above Declaration.

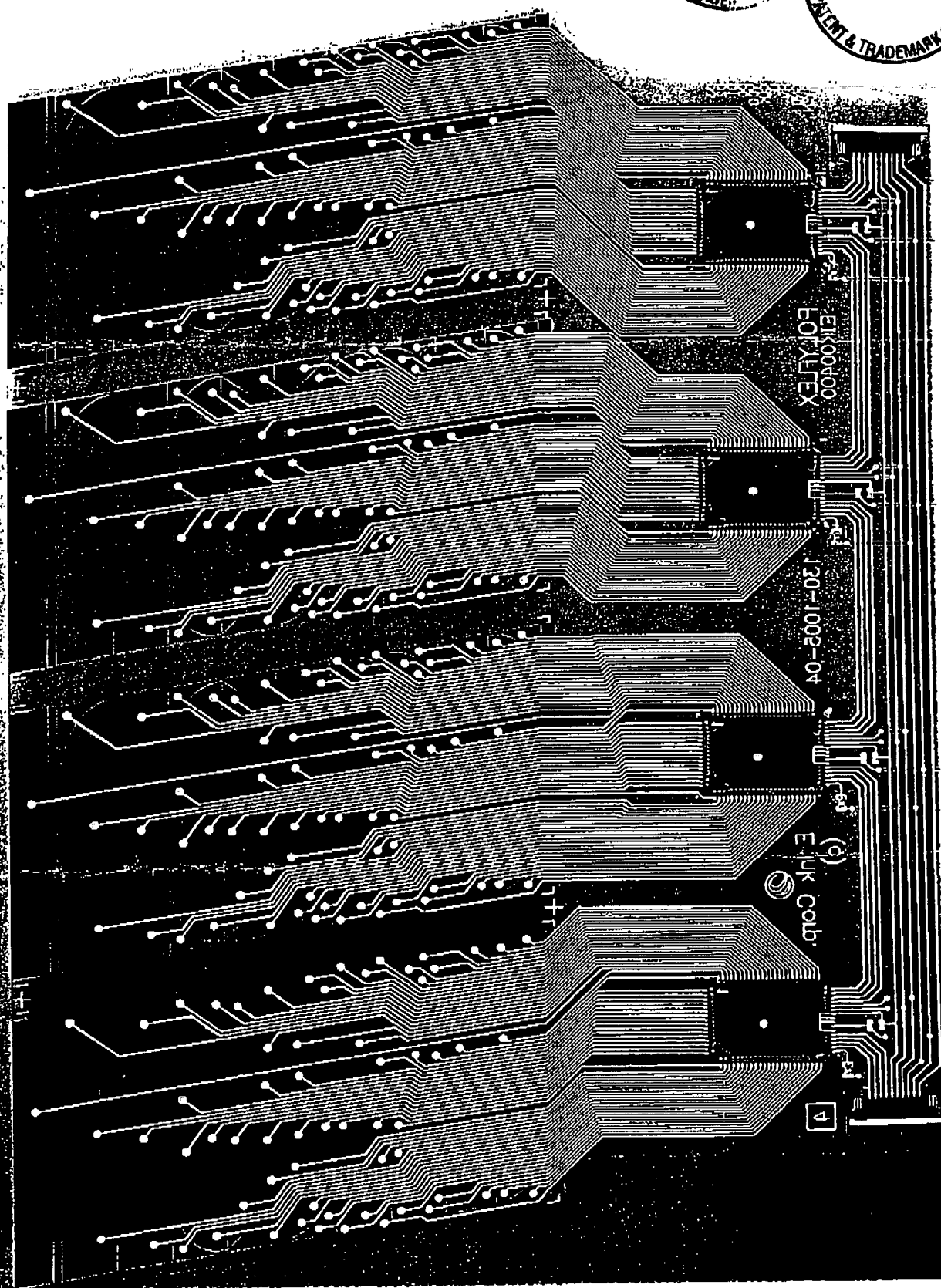
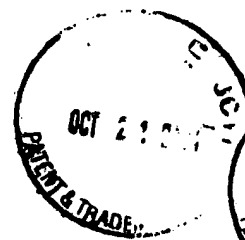
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